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Latest result of geoneutrino measurement with KamLAND (remote)

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The decays of radioactive isotopes, uranium, thorium and potassium, inside the Earth generate a significant amount of radiogenic heat and contribute to the Earth's heat budget. The abundance of these elements is a key parameter to reveal the planet's geophysical activities. Geoneutrinos originated from these isotopes are unique probe to the composition, and thus, the amount of the radiogenic heat in the Earth. KamLAND has observed geoneutrinos from ^{238}U and ^{232}Th with 1 kt liquid scintillator for more than 18 years. The low-reactor period since 2011 enabled a spectroscopic measurement of geoneutrinos from ^{238}U and ^{232}Th by reducing the most significant background, reactor neutrino. The number of geoneutrino signal is estimated to be $116.6^{+41.0}_{-38.5}$, $57.5^{+24.5}_{-24.1}$ and $173.7^{+29.2}_{-27.7}$ from ^{238}U, ^{232}Th and ^{238}U+^{232}Th, respectively. These correspond to geoneutrino flux of $14.7^{+5.2}_{-4.8}$, $23.9^{+10.2}_{-10.0}$ and $32.1^{+5.8}_{-5.3}$ $\times 10^5$ cm^{-2}s^{-1}, respectively. The null-signal hypothesis is disfavored at 8.3σ confidence level. This study yields the first constraint on the radiogenic heat contribution from ^{238}U and ^{232}Th individually, which is consistent to geochemical predictions based on the compositional analysis of chondrite meteorites.
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